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ATTACHMENT 1

TRENTON CHANNEL LOADING EVALUATION
EAST PLANT
ARKEMA INC.
RIVERVIEW/WYANDOTTE, MICHIGAN

MAY AND JULY 2004 EI SAMPLING EVENTs - SUMMARY OF DETECTED CONSTITUENTS IN GSI WELLS EXCEEDING PART 201 GSI CRITERIA[1]:

Aquifer Location				*GSI*	*GSI*	*GSI*	*GSI*	*GSI*	*GSI*	*GSI*	*GSI*
Sample Location		*Part 201*	*Maximum*	*MW-007*	*MW-007*	*MW-007*	*MW-019*	*MW-019*	*MW-023*	*MW-023*	*MW-024*
Sample Identification		*GSI Criteria*	*Concentration*	*EA03-EP-MW007-01*	*EA03-EP-MW007-01*	*EA03-EP-MW007-02*	*EA03-EP-MW019-01*	*EA03-EP-MW019-01*	*EA03-EP-MW023-01*	*EA03-EP-MW023-01*	*EA03-EP-MW024-01*
Sample Date			*(mg/L)*	*5/4/2004*	*7/7/2004*	*7/7/2004*	*5/3/2004*	*7/8/2004*	*5/4/2004*	*7/8/2004*	*5/4 and 5/5, 2004*
Sample Type						*Duplicate*					
Dioxins/Furans	***Units***										
Dioxin Toxicity Equivalent (TEQ)	mg/L	0.00000001	**0.00000022**	**0.00000011 J**	**0.000000049 J**	**0.000000051 J**	**0.00000022 J**	**0.00000002 J**	--	--	--
Metals											
Copper	mg/L	0.01	**0.019**	0.0057	0.0053	0.0057	ND(0.0020)	ND(0.0020)U	**0.019**	0.0068	0.0065
Cyanide (total)	mg/L	0.0052	**0.042**	**0.042**	**0.018**	**0.018**	ND(0.0050)	ND(0.0050)	ND(0.0050)	**0.013**	ND(0.0050)
Lead	mg/L	0.012	**0.019**	0.0020 J	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	**0.019**	0.0024 J	ND(0.0030)
Manganese	mg/L	0.60	**2.8**	0.017	0.015	0.014 J	0.22	0.13	**1.8**	**1.1**	**2.8**
Mercury	mg/L	0.0000013	**0.000057**	ND(0.00020)	ND(0.00020)U	ND(0.00020)U	ND(0.00020)	**0.000038 J**	ND(0.00020)	**0.000057 J**	ND(0.00020)
Selenium	mg/L	0.005	**0.0084**	**0.0084 J**	ND(0.0020)UJ	**0.0072 J**	ND(0.0020)	0.0013 J	ND(0.040)	ND(0.010)UJ	ND(0.020)
Silver	mg/L	0.0002	**0.00043**	**0.00043 J**	0.000084 J	ND(0.00050)UJ	ND(0.00050)	ND(0.00050)UJ	**0.00037 J**	0.00016 J	0.00012 J
Semi-volatile Organic Compounds (SVOCs)											
2,4,6-Trichlorophenol	mg/L	0.005	**0.009**	**0.0075**	**0.009**	**0.0089**	ND(0.004)	ND(0.004)	--	ND(0.004)	ND(0.008)
Naphthalene	mg/L	0.013	**0.033**	ND(0.005)	0.0025 J	0.0026 J	ND(0.005)	ND(0.005)	--	ND(0.005)	**0.033**

Note:

1. Only groundwater samples with GSI exceedances are shown. Groundwater samples collected from MW-005 and MW-015/15R did not have GSI exceedances. Therefore, their results are not shown herein.

LOADING CALCULATION VARIABLES AND EQUATION:

			MW-005	*MW-007*	*MW-15/15R*	*MW-019*	*MW-023*	*MW-024*
K = Hydraulic Conductivity (ft/day) - Max. from Tbl 3.3 of the EP RFI (CRA, 2004a)	=	37.44	1.73	**37.44**	1.19	7.33	3.80	23.14
i = Gradient (ft/ft) - Max. from Nov. 1993 to Aug. 2004 - See Tbl 3.1 (CRA, 2004b)	=	0.040	0.015	0.027	0.016	0.038	**0.040**	0.032
n_e = Effective Porosity (unitless)	=	0.3						
V = Maximum Seepage Velocity (V = K* i / n_e) (ft/day)	=	4.99						
L = Length of River Segment (ft) - Entire Shoreline of the East Plant	=	2,400						
T = Thickness of the Unconsolidated Layer (ft) (30 ft depth of river + 10 feet into river)	=	40						
Q_{gw} = Aquifer Discharge (V*L*T) (ft^3/day)	=	479,232						
C_{gw} = Maximum Concentration Detected in GSI wells (mg/L)	=	(See Above)						
Q_{sw} = Discharge Rate of River (ft^3/day) - See Tbl C.1 (CRA, 2004b)	=	1.30E+10						

$$C_{sw} = \text{Modeled Trenton Channel Concentration} = (C_{gw} * Q_{gw}) / (Q_{gw} + (0.1*Q_{sw}))$$

LOADING CALCULATION RESULTS:

	Maximum Detected Groundwater Concentration used in Model (C_{gw}) (mg/L)	Resulting Modeled Trenton Channel Concentration (C_{sw}) (mg/L)	Part 201-GSI (mg/L)	Modeled Trenton Channel Concentration Exceed GSI Criteria?
Dioxin Toxicity Equivalent (TEQ)	2.20E-07	8.12E-11	1.00E-08	No
Copper	1.90E-02	7.01E-06	1.00E-02	No
Cyanide (total)	4.20E-02	1.55E-05	5.20E-03	No
Lead	1.90E-02	7.01E-06	1.20E-02	No
Manganese	2.80E+00	1.03E-03	6.00E-01	No
Mercury	5.70E-05	2.10E-08	1.30E-06	No
Selenium	8.40E-03	3.10E-06	5.00E-03	No
Silver	4.30E-04	1.59E-07	2.00E-04	No
2,4,6-Trichlorophenol	9.00E-03	3.32E-06	5.00E-03	No
Naphthalene	3.30E-02	1.22E-05	1.30E-02	No